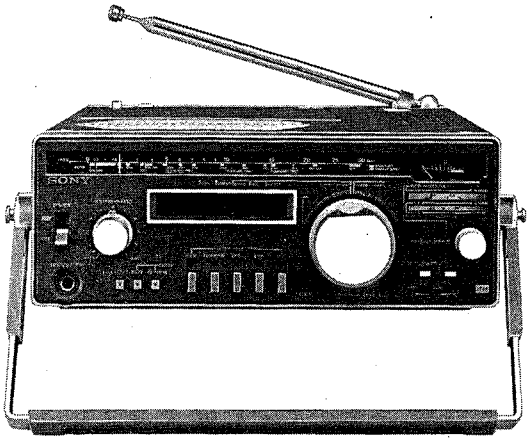
SONY®

PLLシンセサイザーレシーバー /PLL SYNTHESIZED RECEIVER

# CRF-1



## 取扱説明書 3~16ページ

お買い上げいただきありがとうございます。
この製品の性能を十分に生かして正しくお使いいただくため、ご使用前にこの説明書をよくお読みください。
お読みになったあとは大切に保管し、わからないことや不具合が生じたときにもう一度ご覧ください。きっとお役に立ちます。

## OPERATING INSTRUCTIONS page 2, 3, 17-27

- Before operating the set, please read this manual thoroughly.
- This manual should be retained for future reference.

## MODE D'EMPLOI page 2, 3, 29-39

- Avant toute opération, lire attentivement ce mode d'emploi.
- Conserver ce manuel pour toute référence ultérieure.

## BEDIENUNGSANLEITUNG Seite 3, 41—51

- Vor Inbetriebnahme lesen Sie bitte diese Bedienungsanleitung sorgfältig durch.
- Bewahren Sie diese Anleitung zum späteren Nachschlagen gut auf.

## MANUAL DE INSTRUCCIONES página 3, 53-63

- Antes de usar el aparato, lea este manual detenidamente.
- Conserve este manual para futuras referencias.

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## OWNER'S RECORD

The model number and serial number are located at the rear. Record these numbers in the spaces provided below. Refer to them whenever you call upon your Sony dealer regarding this product.

Model No. CRF-1 Serial No._____

## WARNING

- To prevent fire or shock hazard, do not expose the set to rain or moisture.
- To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

## ENREGISTREMENT PERSONNEL

Les numéros de modèle et de série se trouvent à l'arrière de l'appareil. Les inscrire dans l'espace prévu ci-dessous. Rappeler ces numéros lorsque l'on contacte le concessionnaire Sony pour tout problème relatif à cet appareil.

Modèle N°. CRF-1 Série N°._____

## AVERTISSEMENT

- Afin d'éviter tout risque d'incendie ou d'électrocution, éviter d'exposer l'appareil à la pluie ou à l'humidité.
- Afin d'écarter tout risque d'électrocution, garder le coffret fermé. Ne confier l'entretien de l'appareil qu'à un personnel qualifié.

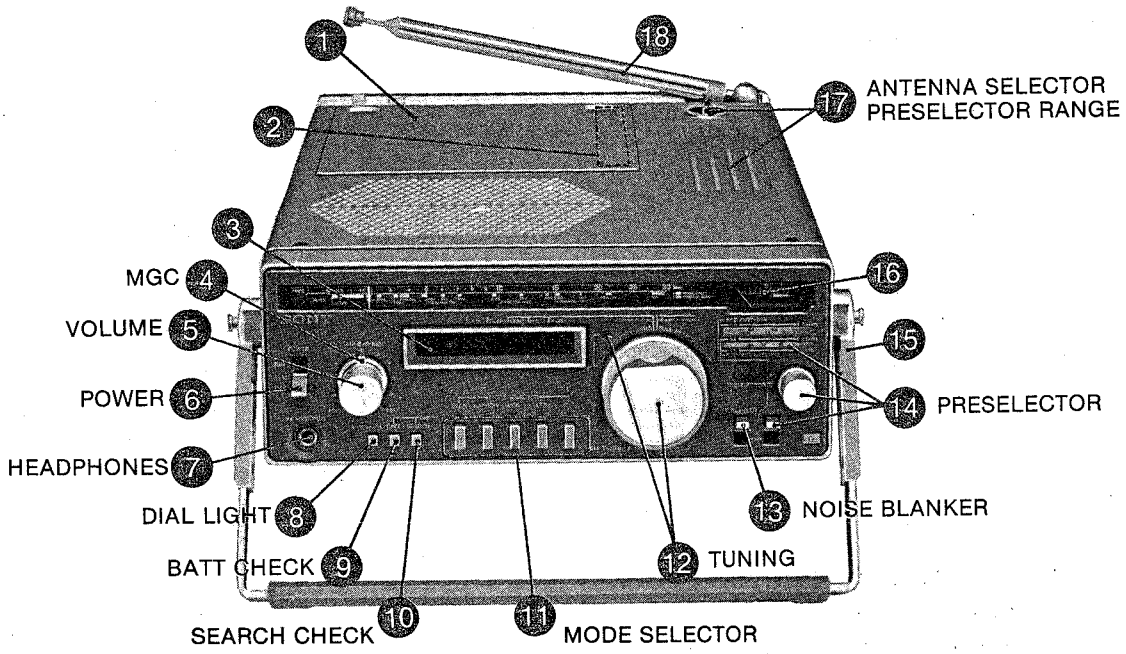
このページを開き出して6、7ページの"各部の名称と使いかた"と合わせてお読みください。

The numbers are keyed to those of the "LOCATION AND FUNCTION OF CONTROLS" on pages 18 and 19.

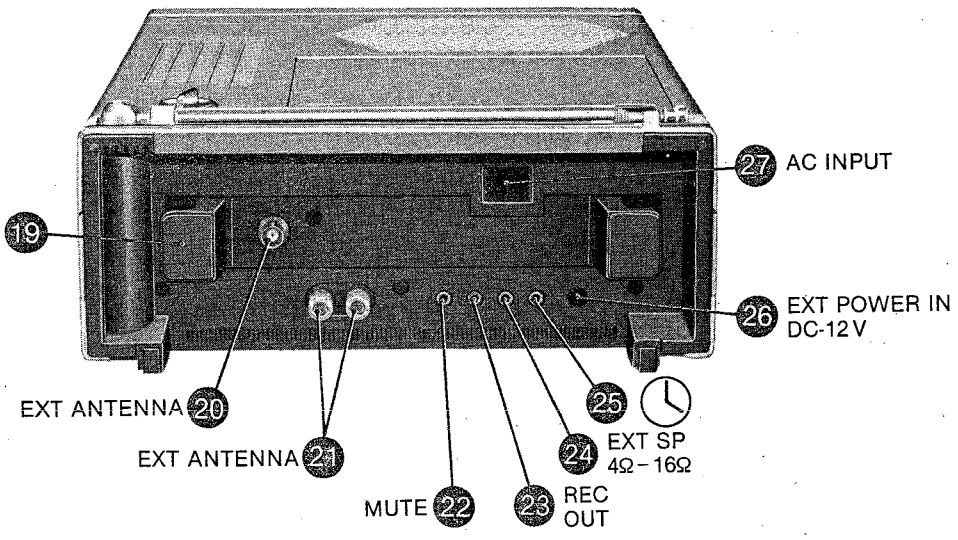
Les nombres correspondent à ceux du chapitre "EMPLACEMENT ET FONCTIONS DES COMMANDES", pages 30 et 31.

Die Nummern beziehen sich auf deren des Abschnittes „LAGE UND FUNKTION DER BEDIENUNGSELEMENTE" auf Seiten 42 und 43.

Los números corresponden a los de "SITUACION Y FUNCION DE LOS CONTROLES" en las páginas 54 y 55.




裏面パネル / rear panel/panneau arrière/Rückseite/panel posterior



English

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## FEATURES

- **A professional quality receiver** designed to provide quality AM (Amplitude Modulation), SSB and CW reception anywhere in the world.
- **World-wide AM all band coverage from 10 kHz to 30 MHz,** allowing reception in the MW ("standard" broadcast), SW (short wave), LW (long wave and beacon), and VLF (very low frequency, Omega transmission) bands, including stations operating on LSB and USB (single side bands), and CW (international Morse code).
- **Accurate tuning** with the dual conversion superheterodyne circuit and an up-conversion system using a monolithic crystal filter in the first IF stage.
- **Easy tuning with a single tuning knob,** performing frequency spectrum selection, search and fine tuning, and, two ways to read frequencies: from a digital frequency display and from a linear dial.
- An customerized LSI (Large Scale Integrated circuit) in the PLL (Phase Locked Loop) synthesizer block **makes band selection unnecessary.**
- Eight band pass filter blocks in the RF unit and the preselector circuit **reduce interference.**
- **Stable SSB/CW reception** by using quartz crystals in the beat frequency oscillator circuit.
- **WIDE and NARROW selectivity modes** for optimum reception. **Higher selectivity** on SSB and CW.
- **Noise Blanker** reduces ignition noise.
- **Monocoque diecast aluminum chassis** for high mechanical and electronic reliability, suppressing the generation of internal spurious signals.
- **Easy portability** with the Telescopic Antenna and special Carrying Handle.
- **Three different power sources:** batteries, house current and a car battery.

## PRECAUTIONS

- Operate the set only on 12 V dc.

For ac operation, use the supplied ac power adaptor and ac power cord. Do not use any other ac power adaptor or ac power cord. For car battery operation, use the car battery cord recommended for this set. Do not use any other car battery cord.

- The nameplate indicating operating voltage, power consumption, etc. is located on the rear of the set and on the top of the ac power adaptor.
- The ac power adaptor is not disconnected from the ac power source as long as it is connected to the wall outlet, even if the set itself has been turned off.
- Unplug the set from the wall outlet when it is not to be used for an extended period of time. To disconnect the cord, pull it out by grasping the plug. Never pull it out by the cord.
- When the set is not to be used for a long period of time or is to be operated extensively on a car battery, remove the batteries to avoid set damage from battery leakage.
- Do not install the set in a location near heat sources such as radiators or airducts, or in a place subject to direct sunlight, excessive dust, mechanical vibration, or shock.
- Allow adequate air circulation to prevent internal heat build-up. Do not place the set on surfaces (rugs, blankets, etc.) or near materials (curtains, draperies) that may block the ventilation holes.
- Should any liquid or solid object fall into the set, unplug the set, remove the batteries or the ac power adaptor, and have the set checked by qualified personnel before operating it any further.
- Since a strong magnet is used in the speaker, keep credit cards using magnetic coding, recorded tapes, and watches (with hands) away from the set to prevent possible damage caused by the magnet.
- When there is lightning and you are using an external antenna, immediately disconnect the AC power cord (if connected) from the wall outlet. Never touch the antenna wire when there is lightning storm.
- Never connect a ground wire to a gas pipe.
- If you have any question or problem concerning your set that is not covered in this manual, please consult your nearest Sony dealer.

# LOCATION AND FUNCTION OF CONTROLS

Refer to the photo on page 3.

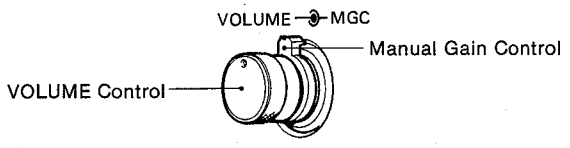
**Front and top panels**

⑭ **AC Power Adaptor/Battery Compartment:** Refer to "POWER SOURCES", pages 19, 20 and 21.

㉒ **Backup Battery Compartment:** See page 21.

⑬ **Frequency Counter:** A digital display of the frequency being received. The tuned frequency is displayed in kHz with the TUNING knob pulled out, and to the 100 Hz place with the knob pushed in.

㉔ **Manual Gain Control [MGC]:** This control should usually be turned fully clockwise for maximum sensitivity. When receiving a distorted singal from a very strong station, or to eliminate interstation noise, turn this control counterclockwise until distortion-free sound is obtained or the noise is eliminated. If the control is turned counterclockwise under normal conditions, sound level may be very low or there may be no sound at all.




⑤ **VOLUME Control:** Turn clockwise for more volume.

⑥ **POWER Switch:** Set to ON to turn on the power.

⑦ **HEADPHONES Jack:** For listening to monaural sound with 8-ohm headphones.

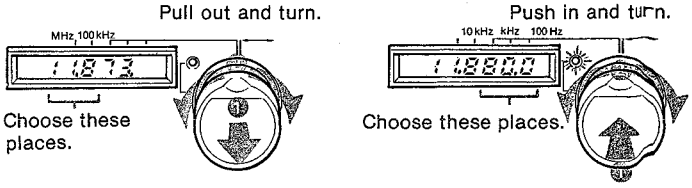
⑧ **DIAL LIGHT Button:** During dc operation, when this button is depressed, the Dial Scale, Signal Strength Meter and PRESELECTOR scale are illuminated. During ac operation, they are illuminated at all times when the POWER switch is ON. On car battery operation, if the ac power adaptor is in the compartment, they are also illuminated.

⑨ **Battery Check Button [BATT CHECK]:** When operating with batteries, press this button to check the condition of the batteries. See page 21.

⑩ **SEARCH CHECK Button:** When tuning with the TUNING knob pushed in, press this button to check the frequency display which would normally appear in the Frequency Counter if the TUNING knob was pulled out.

⑪ **MODE SELECTOR Buttons:** Depress the desired mode button before tuning. The button will be released when another button is pressed.
WIDE: for MW/LW/SW reception under normal conditions.
NARROW: for MW/LW/SW reception under conditions of noise and interference. A narrower bandwidth permits quieter reception.
USB: for upper sideband signal reception.
LSB: for lower sideband signal reception.
CW: for CW (code) signal reception.

⑫ **TUNING Knob and Indicator:** Pull the knob out and turn to search for station or to adjust the digits to the 100 kHz place (30.0 MHz–00.1 MHz) to match those of a station to be tuned in. Then push the knob in for more precise tuning. The Frequency Counter will display this fine tuning position to the 100 Hz place, and the red indicator will light, showing the reception is stabilized.




**Note:** When the TUNING knob is pushed in and turned all the way to the left, the final three "0"s of the frequency are not displayed; when turned all the way to the right, the final three "9"s will not be displayed.

⑮ **NOISE BLANKER:** When impulse noise, such as ignition noise disturbs the reception, set this switch to ON to cut off or reduce the noise. Normally set the switch to OFF, as unnecessary use of this function may result in distorted sound.

⑯ **PRESELECTOR Switch, Knob and Scale**
**When the switch is set to IN:** The preselector circuit will operate and optimum sensitivity will be obtained on the frequency indicated by the pointer on the PRESELECTOR scale. Turn the PRESELECTOR knob to set the pointer to the approximate frequency of the station being received.
- During reception with the Telescopic Antenna, be sure to set the switch to IN.

**When the switch is set to OUT:** Use this position only for reception with an external antenna. The preselector circuit will not operate and there will be uniform sensitivity throughout 10 kHz– 30 MHz range, though sensitivity will be lower than when the switch was IN. The use of this position permits easy tuning, since adjustment of the PRESELECTOR knob is not necessary.

⑰ **Carrying Handle:** For the adjustment of the angle of the handle, refer to page 25.

⑱ **Signal Strength/Battery Meter:** This is a dual function meter. Normally, the strength of a signal is shown by the amount of pointer deflection. Maximum pointer deflection to the right means a very strong signal is being received from the station.
The pointer shows the battery condition when the BATT CHECK button is depressed. See page 21.

⑲ **ANTENNA SELECTOR and PRESELECTOR RANGE:** Set the knob to the appropriate position, according to the type of antenna and the signal strength of the station being received.
EXT ANT
RF ATT –26 dB: Use this position during reception with an external antenna, if the sound is distorted while receiving a very strong signal, or if interference occurs.
EXT ANT: for reception under normal conditions with the external antenna.
ROD ANT: for reception under normal conditions with the Telescopic Antenna.
ROD ANT
RF ATT: Use this position during reception with the Telescopic Antenna, if the sound is distorted while receiving a very strong signal, or if interference occurs.

**Key lines on the PRESELECTOR RANGE**
- red zone: shows the operating range of the preselector.
- black line: shows the operating range of the antenna.

VLF: Very Low Frequency range
LF: Low Frequency range
MF: Medium Frequency range
HF: High Frequency range

⑱ **Telescopic Antenna:** For 150 kHz–30 MHz reception. Pull out the antenna to its full length and stand it up vertically. If a fluorescent lamp is directly overhead, adjust the angle and direction of the antenna to avoid picking up noise. When rotating the antenna in a horizontal position, take care not to damage the surface of the cabinet.
Sometimes, touching a metal part of the set will affect the sensitivity of the antenna and influence the volume and sound quality. When this happens, adjust the position of the antenna while tuning.

### Rear panel

⑲ **Cord Clamps:** For securing the ac power cord when not in use.

⑳ **BNC Antenna Connector [EXT ANTENNA]:** For connecting an external antenna using a 50–75 ohm coaxial cable equipped with a BNC plug.

㉑ **External Antenna Terminals [EXT ANTENNA]:** For connecting an external antenna. The [⏄] terminal is for the antenna and the [⏚] terminal for ground. See page 24.

㉒ **MUTE Input Jack:** For connecting equipment which has a muting control.

㉓ **Recording Output Jack [REC OUT]:** Minijack for recording radio programs with a tape recorder. Connect this jack to the line input jack of a tape recorder with an appropriate cord. When connecting a Sony stereo tape recorder, use Sony Connecting Cord RK-105A (optional); a Sony monaural tape recorder, Sony Connecting Cord RK-69A (optional).

㉔ **External Speaker Jack [EXT SP 4Ω–16Ω]:** Minijack for connecting an external speaker. Also used for recording radio programs with a monaural tape recorder without line input jack. Connect this jack to the microphone input jack of the tape recorder, using Sony Connecting Cord RK-64A (optional).

㉕ **Timer Input Jack [🕓]:** For turning the radio on and off with an appropriate timer.

㉖ **External Power Input Jack [EXT POWER IN DC-12V]:** For connection with a car battery.

㉗ **Cutout for ac connection [AC INPUT]:** When connecting the supplied ac power cord to the AC INPUT socket of the ac power adaptor, insert the cord plug through this sliding door. When the ac power adaptor is removed, the cutout will close.

# POWER SOURCES

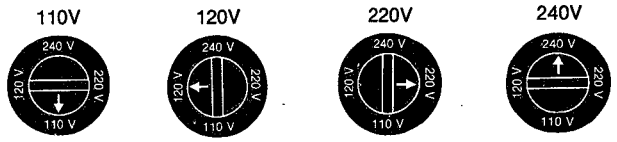
### HOUSE CURRENT

The ac power adaptor which your receiver comes with, depends on the location where you bought it.

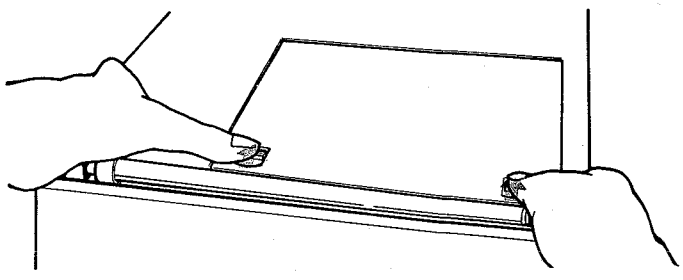
| location | ac power adaptor | operating voltage setting | voltage selector |
|---|---|---|---|
| Japan | ACP-122 | 100 V ac | no (adjustable to 110, 120, 220 or 240 V ac, by a qualified Sony technician) |
| Canada | ACP-122W | 120 V ac | no (adjustable to 110, 220 or 240 V ac, by a qualified Sony technician) |
| USA | ACP-122W | 120 V ac | provided (adjustable to 110, 120, 220 or 240 V ac) |
| The United Kingdom | ACP-122W | 240 V ac | |
| European countries | ACP-122W | 220 V ac | |
| Other countries | ACP-122W | 120 or 220 V ac | |
| Tourist model in Japan* | ACP-122W | 220 V ac | |

* The tourist model in Japan is provided with an ac plug adaptor for use in Japan.

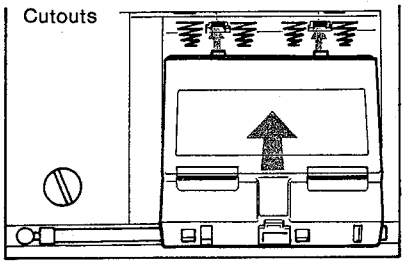
**Caution:** Before inserting the ac power adaptor into its compartment, be sure that the Voltage Selector (if you have one) of the ac power adaptor is correctly set to your local power line voltage. If necessary, turn the selector with a coin or similar so that the arrow mark of the selector points to the appropriate voltage.



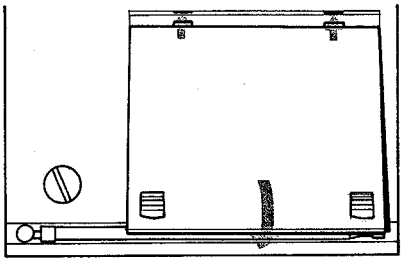

After confirming that the operating voltage is correct, insert the ac power adaptor into its compartment.
❶ Remove the lid on the top panel by releasing two thumb latches.



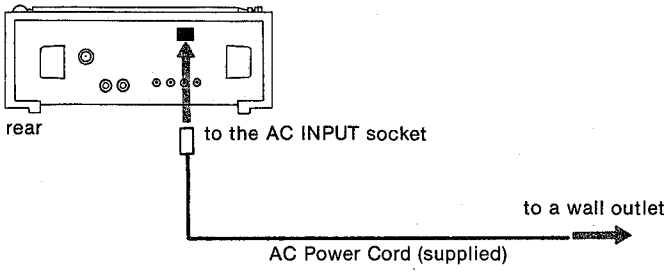
❷ Install the ac power adaptor into the compartment with the label side up. First insert the two equally spaced projections on the adaptor into the cutouts between the springs in the compartment, then push the adaptor into the springs and down until it locks.




❸ Replace the lid.



❹ Connect the supplied ac power cord to the AC INPUT socket of the adaptor through the cutout of the set, then connect it to a wall outlet.




**To remove the ac power adaptor**

Unplug the ac power cord from the AC INPUT socket. Press the adaptor against the springs and disengage the two unequally spaced projecting parts from two slots on the rear wall of the compartment and lift the adaptor from the compartment.

**Notice for the customers in the United Kingdom**

**IMPORTANT**

The wires in this mains lead are coloured in accordance with the following code:

blue: Neutral

Brown: Live

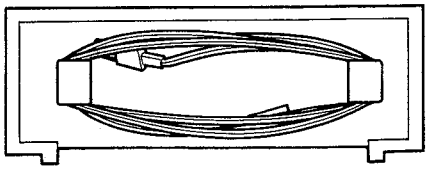
As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured marking identifying the terminals in your plug, proceed as follows:

The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black. The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

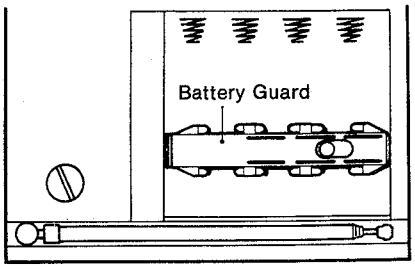
**BATTERIES**

**Battery installation**

❶ Unplug the ac power cord and fold it around the Cord Clamps at the rear of the set.

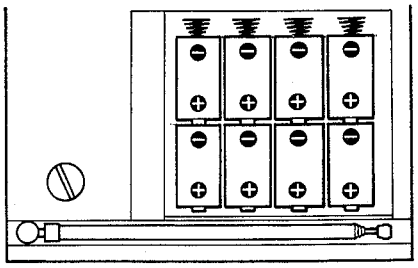


❷ Remove the lid and lift out the ac power adaptor and the orange Battery Guard stored on the floor of the compartment.

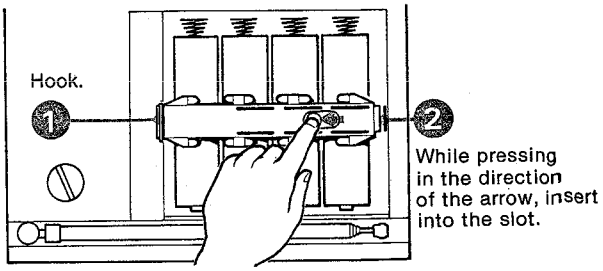



❸ Insert eight batteries, IEC designation R20 (size D), into the compartment with the correct polarity.

- The flat side of the batteries press against the springs.



❹ Hook on the Battery Guard as illustrated to secure the batteries.




❺ Close the lid.

- The set cannot be operated on internal batteries when the car battery cord is connected to the set.
- When the set is not to be used for a long period of time or is to be operated extensively on the car battery, remove the batteries to avoid damage from battery leakage and corrosion.
- When the set is not used with batteries, keep the Battery Guard on the floor of the compartment.

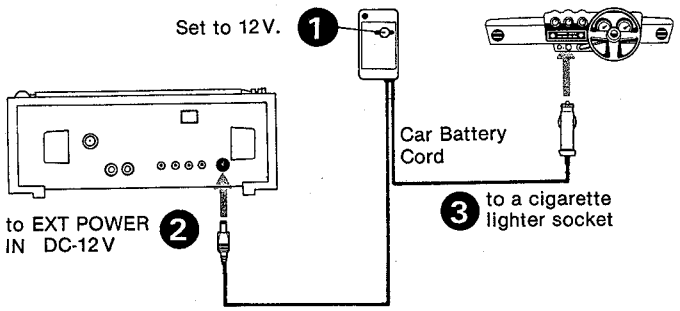
**Battery life**
Approximately 3 total hours of use operating the radio at a normal volume is possible with Sony Super Batteries SUM-1S, or approximately 6 total hours of use with Eveready Heavy Duty Batteries No. 1250.

**To check battery condition**
While operating the set (POWER switch ON), keep the BATT CHECK button pressed and observe the pointer of the Singal Strength Meter. If the pointer does not lie within the white zone, replace all the batteries with fresh new ones.

good battery condition

Replace the batteries.

**CAR BATTERY**
Use the optional Sony Car Battery Cord DCC-120 for a 12 V car battery or DCC-240* for a 24 V car battery, and connect the radio EXT POWER IN DC-12 V jack to the cigarette lighter socket of a car. For further details, refer to the instruction manual of the DCC-120 or DCC-240.
- Before connecting, be sure to set the output voltage of the car battery cord to 12 V.

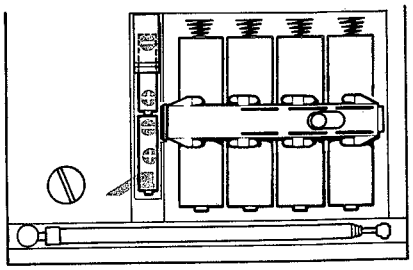



- When the car battery cord is connected to the EXT POWER IN DC-12 V jack, the ac power adaptor and the internal batteries (if present) are automatically disconnected.
- Reception may be affected by ignition noise while the engine is in operation.

* The DCC-240 will be available in near future.

**BACKUP BATTERIES**
If the batteries are installed into Backup Battery Compartment, the last station memory circuit functions when the POWER switch is set to OFF, and the next time when the POWER switch is set to ON, the frequency last tuned in will appear on the Frequency Counter.

**Backup battery installation**
❶ Open the lid.
❷ Insert two batteries, IEC designation R6 (size AA), into the Backup Battery Compartment with the correct polarity.
- The protruding positive terminal of one battery presses against the flat bottom of the other.



**Backup battery life**
About one year of operation can be expected from Sony Super Batteries SUM-3S or from Eveready Heavy Duty Batteries No. 1215. When the batteries become weak, the frequency last tuned to may not be held in the memory. When this happens, replace both batteries with fresh new ones.
**Note:** Be sure to replace the batteries for the last station memory function at least once a year to avoid possible damage from battery leakage.

# RECEPTION

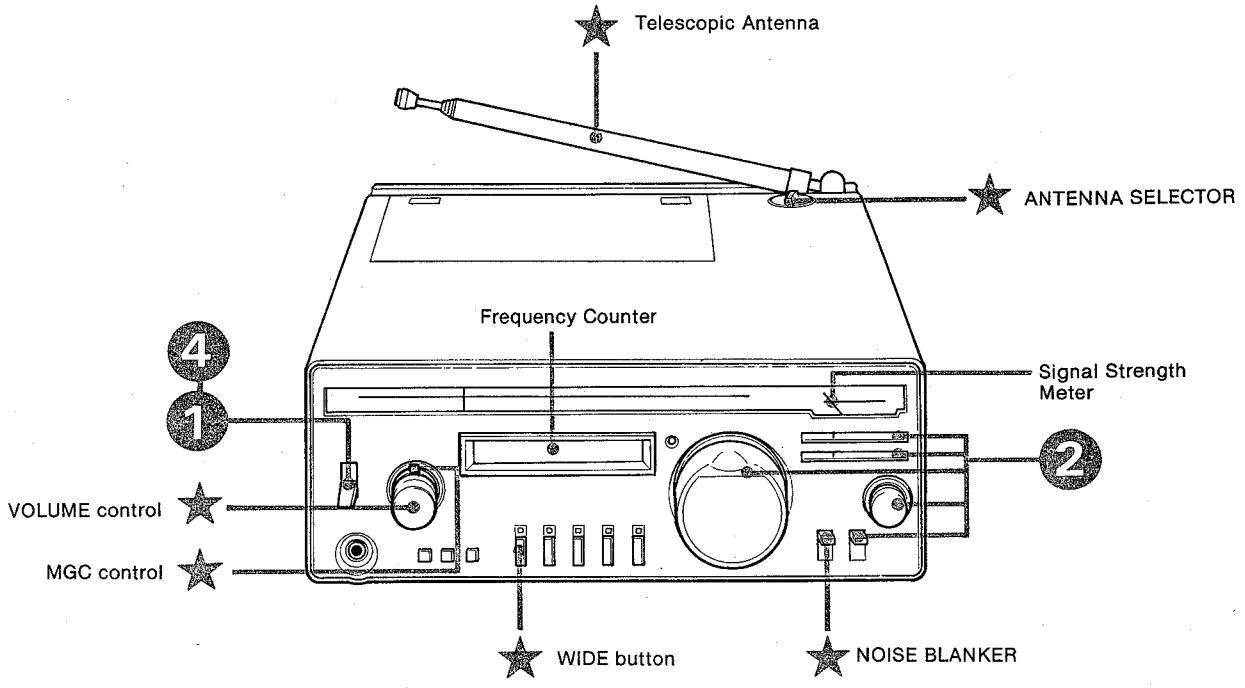
### LW/MW/SW RECEPTION

The numbers in the illustration refer to the sequence of operations.

Make the following initial adjustments with the ★ marked controls.
- Turn the VOLUME control colckwise a little to get sound.
- Turn the MGC control fully clockwise to MAX.
- Depress the WIDE button of the MODE SELECTOR.
- Set the NOISE BLANKER to OFF.
- Pull out the Telescopic Antenna to its full length and stand it straight up, or connect the external antenna. (To connect an external antenna, refer to page 24.)
- Set the ANTENNA SELECTOR to the appropriate position, according to the type of antenna used and the signal strength of the station being tuned. See page 19.

❶ Set the POWER switch to ON.
❷ Tune in a station with the TUNING knob, PRESELECTOR switch and knob. Refer to "HOW TO TUNE IN A STATION" on page 23.
❸ Readjust the ★ marked controls as necessary:
- Adjust the VOLUME control to your preference.
- If there is noise and interference, depress the NARROW button of the MODE SELECTOR, or set the NOISE BLANKER to ON.
- If the signal being received is too strong and the sound is distorted, or inter-station noise disturbs the tuning, turn the MGC control counterclockwise until distortion-free sound can be obtained. If this control is turned counterclockwise during normal reception, there may be no sound or it may be very low.

❹ To turn off the radio, set the POWER switch to OFF.




### SSB AND CW RECEPTION

The operating procedures for SSB and CW reception are the same as for ordinary LW/MW/SW reception, except for the following:
- Depress the USB, LSB or CW button of the MODE SELECTOR according to the signals to be received, instead of the WIDE or NARROW button.*
- When tuning in a station, turn the TUNING knob more slowly than you do for ordinary LW/MW/SW tuning.

* When the USB, LSB or CW button of the MODE SELECTOR is depressed, the figures of the Frequency Counter will be increased or decreased by 1.5 kHz to coincide with the frequency counter reading of the normal SSB carrier frequency.

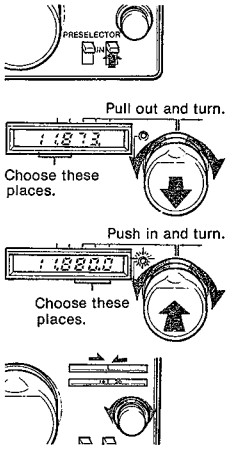
## HOW TO TUNE IN A STATION

### With the Telescopic Antenna

**When you know the frequency of the station to be tuned in**

(**For example:** To tune in the station "RADIO AUSTRALIA" 11880 kHz)

1. Set the PRESELECTOR switch to IN.
2. Pull the TUNING knob out and turn it to adjust the digits to the 100 kHz place on the Frequency Counter to match those of the station to be tuned in.
3. Push the TUNING knob in and turn it to adjust to the exact frequency.
4. Turn the PRESELECTOR knob and set the pointer of the PRESELECTOR scale to **approximately** the same frequency as that of the Frequency Counter, so that the pointer of the Signal Strength Meter swings to the right as far as possible.




**When you do not know the frequency of the station to be tuned in**

1. Set the PRESELECTOR switch to IN.
2. Search for a station with the TUNING knob pulled out, at the same time adjusting the PRESELECTOR knob to **approximately** the same frequency on the PRESELECTOR scale as is indicated on the Frequency Counter. Then push the knob in and tune the station in precisely, checking the frequency displayed when the TUNING knob was pushed in with the SEARCH CHECK button.
3. Turn the PRESELECTOR knob and set the pointer of the PRESELECTOR scale to **approximately** the same frequency as that of the Frequency Counter, seeing that the pointer of the Signal Strength Meter swings to the right as far as possible.

### With an external antenna

1. Set the PRESELECTOR switch to OUT whether or not you know a station's frequency.
2. Tune in the desired station or search for a station with the TUNING knob pulled out, then tune in the station precisely with the TUNING knob pushed in.
3. Reset the PRESELECTOR switch to IN.
4. Turn the PRESELECTOR knob as with the Telescopic antenna.

● If the reception is difficult with the PRESELECTOR switch set to OUT, set it to IN and proceed as with the Telescopic Antenna.

**Notes**

● If 000. is tuned with the TUNING knob pulled out, when the TUNING knob is pushed in, the Frequency Counter will show 0 or 000.0, and it will be locked at this reading. When this happens, pull the knob out and move the frequency away from 000..

● Reception of 10.24 and 20.48 MHz may be difficult because of internal spurious signals generated by the built-in oscillators.

**RERERENCE CHART**

When performing the step ⓬ in the "LW/MW/SW RECEPTION", make use of this table below for quick reference.

| Antenna | Do you know a station frequency? | PRESELECTOR switch | TUNING knob | PRESELECTOR knob | TUNING knob | PRESELECTOR switch | PRESELECTOR knob |
|---|---|---|---|---|---|---|---|
| Telescopic Antenna | → Yes | → IN | → Pull out. | | → Push in. | | → Adjust precisely. |
| | → No | → IN | → Pull out. | → Adjust. | → Push in. | | → Adjust precisely. |
| External Antenna | → Yes or No | → OUT | → Pull out. | | → Push in. | → IN | → Adjust precisely. |

# EXTERNAL ANTENNA CONNECTION

The use of an external antenna will greatly improve the reception of weak signals and give more stable reception.

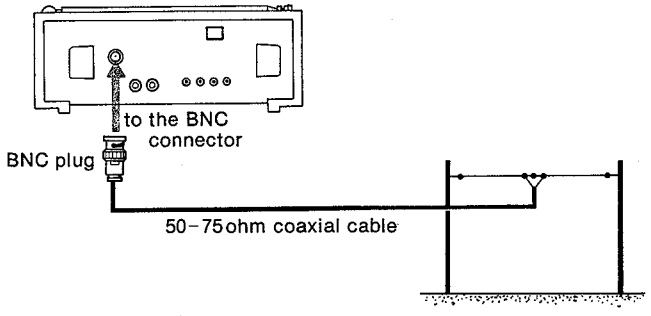
**Notes**

- The use of a suitable lightning arrestor is recommended if the antenna extends outdoors.
- To avoid the possibility of a fire, never connect the ground wire to a gas pipe.

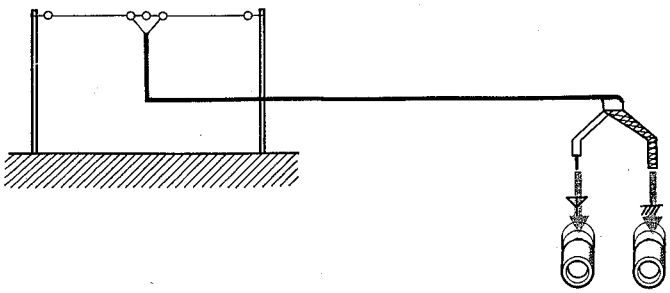
## ANTENNA WIRE CONNECTION

**50–75 ohm coaxial cable connection**

When using a coaxial cable, connect a commercially available BNC plug to the cable end and insert the plug into the BNC connector.




Connect a coaxial cable without BNC plug directly to the ⏄ and ⏄ EXT ANTENNA terminals.



Ideally, the length of the antenna wire should match the frequency being received. Although you will probably listen to many different frequencies, base the length of the antenna on the frequency most often listened to.

Refer to the following formula to determine the antenna length:

$$L \text{ (meters)} = 0.475\lambda = \frac{143}{\text{frequency (MHz)}}$$

L (meters).....length of antenna wire in meters

λ.....wavelength

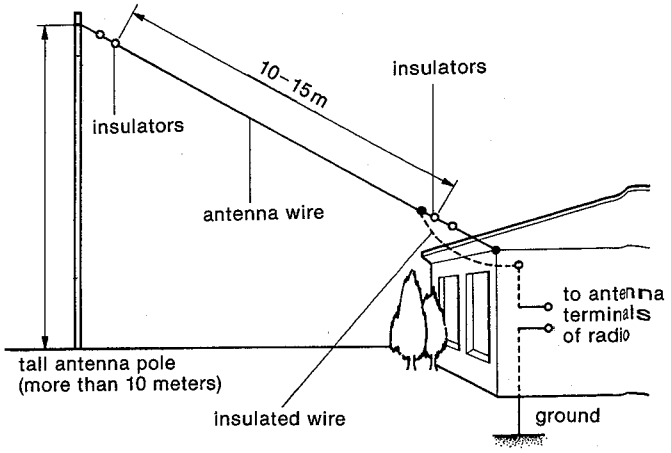
Extend the antenna wire outdoors as high as possible and keep it from touching other metal or trees. Keep it far away from high voltage power transmission lines and noisy electrical machinery. Also, position the antenna at right angles to power lines, electrical wiring, or any other antennas.

**Long wire antenna**

This is the simplest antenna to build. You can string it between handy trees or the buildings around you.

The higher the antenna, the more effective.

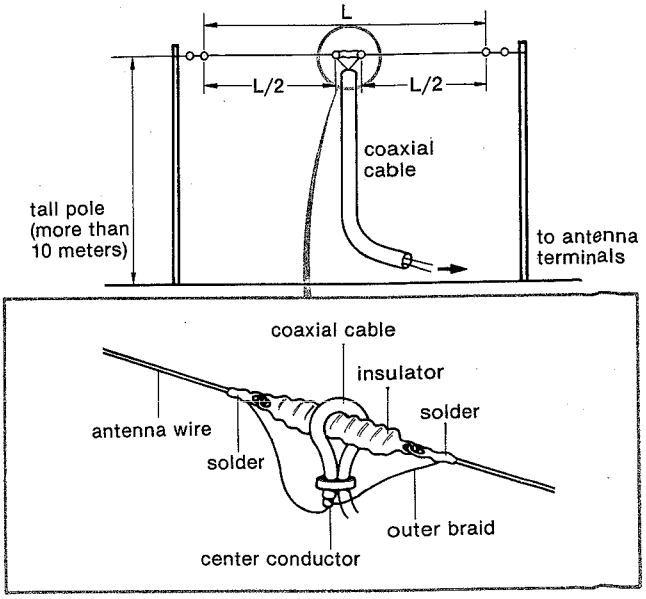
If you use bare wire for the antenna, you must insulate it where the antenna wire passes through the wall of a building.



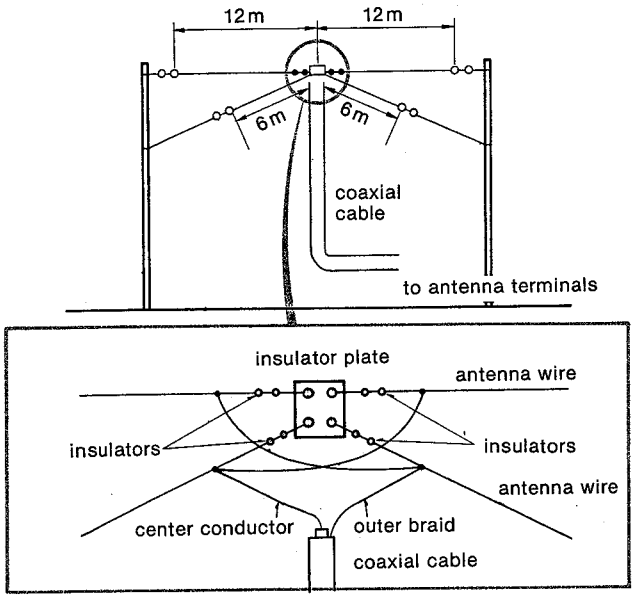

**Doublet antenna**

You can get comparatively good low-noise reception from this type of antenna which is one-half the signal wavelength.

The antenna length can be obtained from the formula on the left column. If the antenna length is tailored to the desired wavelength, very good reception can be obtained at the desired frequency, though results will not be as good at other frequencies.

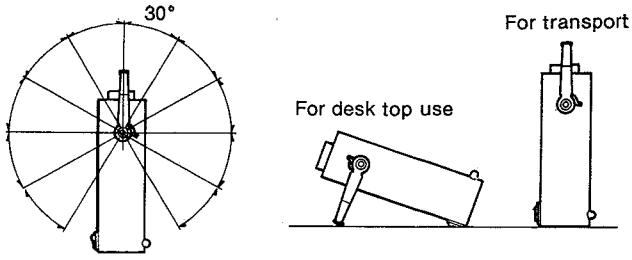


**Twin doublet antenna (all wave antenna)**
The twin doublet antenna shown below is the best antenna for covering the wide frequency range of SW reception. It is similar to the doublet antenna just described, but you can get wider frequency coverage by use of the 2 elements illustrated. Typically, you can get good reception from 6 MHz to 17 MHz with the antenna shown below.

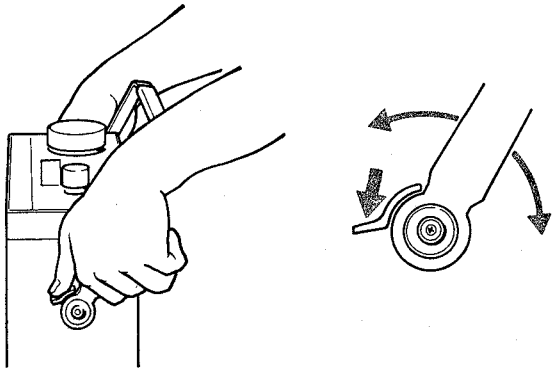



## HOW TO ADJUST THE CARRYING HANDLE

The Carrying Handle position can be fixed at successive angles of 30°, as illustrated.




To adjust the angle of the handle, unlock the handle by releasing (by applying pressure in the direction of the arrows) both levers using both thumbs. When the handle is turned, it will lock automatically at the next angle.



**Caution:** Always adjust and lock the position of the carrying handle **with the set standing vertically,** to avoid its dropping on your fingers.

# SPECIFICATIONS

Circuit system — Dual conversion superheterodyne
Semiconductors — Signal circuit: 4 ICs, 14 FETs, 17 transistors, 38 diodes
Auxiliary circuit: 17 ICs, 7 FETs, 51 transistors, 61 diodes (including 12 LEDs)
Frequency range — AM 10 kHz–30 MHz (30,000–10 m)
Operating modes — AM (WIDE, NARROW), USB, LSB, CW
Intermediate frequency
1st: 55.845 MHz
2nd: 455 kHz
Sensitivity

| Frequency | AM (NARROW) | SSB |
|---|---|---|
| 10 kHz–50 kHz | 30 dB (30 μV) | 20 dB (10 μV) |
| 50 kHz–30 MHz | 0 dB (1 μV) | −10 dB (0.3 μV) |

Selectivity

| Mode / Band width | AM | | SSB |
|---|---|---|---|
| | WIDE | NARROW | |
| −6 dB | 10 kHz | 4.4 kHz | 2.0 kHz |
| −60 dB | 16 kHz | 8.0 kHz | 3.4 kHz |

Image rejection — 1st: 100 dB at 10 MHz
2nd: 90 dB at 10 MHz
IF rejection — 90 dB at 10 MHz
Antennas — Telescopic antenna (150 kHz–30 MHz)
External antenna terminals (10 kHz–30 MHz) 50–75 ohms, BNC connector and 2-p terminal
Speaker — Approx. 10 cm (4 inches) dia.
Power output — 1.2 W (at 10% harmonic distortion) at dc operation
Inputs — Timer input jack (minijack)
Mute input jack (minijack)
Outputs — Recording output jack (minijack)
output level 150 mV (−14 dB)
output impedance 600 ohms
Headphones jack (stereo binaural type jack)
for 8-ohm impedance stereo or monaural headphones
External speaker jack (minijack)
Accepts 4–16 ohm speaker.
Power requirements — Receiver section: 12 V dc, eight batteries
IEC designation R20 (size D)
100, 110, 120, 220 or 240 V ac with supplied Sony AC Power Adaptor listed on page 19.
12 V car battery with Sony Car Battery Cord DCC-120 (optional)
24 V car battery with Sony Car Battery Cord DCC-240 (optional)
Memory circuit: 3 V dc, two batteries IEC designation R6 (size AA)
Battery life — Receiver section: Approx. 3 total hours of use with Sony Super Batteries SUM-1S (at normal listening level)
Approx. 6 total hours with Eveready Heavy Duty Batteries No. 1250
Memory circuit: Approx. 1 year with Sony Super Batteries SUM-3S or Eveready Heavy Duty Batteries No. 1215
Dimensions — Approx. 260×100×330 mm (w/h/d) ($10\frac{3}{8}$×4×$13\frac{1}{8}$ inches)
incl. projecting parts and controls, without carrying handle
Weight — Approx. 6.6 kg (14 lib 9 oz)
incl. batteries or ac power adapror
Accessories supplied — AC Power Adaptor
AC Power Cord
Battery Guard (stored in the Battery Compartment)
Optional accessories — Car Battery Cord DCC-120 (for a 12 V car battery) or DCC-240 (for a 24 V car battery, available in near future)
Headphones DR-7, DR-35
Connecting Cord RK-105A (two phono plugs to a mini plug, for connecting a stereo tape recorder)
RK-69A (miniplug to miniplug, for connecting a monaural tape recorder)
RK-64A (miniplug to miniplug, with attenuator, for connecting a monaural tape recorder)

While the information given is true at the time of printing, small production changes in the course of our company's policy of improvement through research, and design might not necessarily be indicated in the specifications. We would ask you to check with your appointed Sony dealer if clarification on any point is required.

Your dealer may not handle some of the above listed optional accessories. Please ask the dealer for detailed information about the optional accessories available in your country.

* The figures in the specifications are the typical figures.

# TROUBLE CHECKS

Should any problem occur with the set, make the following simple tests to determine whether or not servicing is required. If the problem persists after you have made these tests, consult the nearest Sony dealer for further information.

**No digits appear on the Frequency Counter.**
- The ac power cord is not connected (on ac operation).
- Battery operation is attempted while the car battery cord is connected to the set but not the cigarette lighter socket.
- The Battery Guard is not positioned properly over the batteries.
- Incorrect polarity of batteries.
- Weak batteries.

**No sound from the speaker.**
- The headphones are plugged in.
- The cord plug is connected to the MUTE jack.
- The VOLUME control or the MGC control is turned down.

**Very weak or interrupted sound, or unsatisfactory reception.**
- Weak batteries.
- Improper tuning.
- The MGC control is turned counterclockwise.
- Incorrect position of the ANTENNA SELECTOR.
- Improper adjustment of the PRESELECTOR switch or knob.
- Improper MODE SELECTOR button is depressed.

**The frequency of the station last received is not displayed the next time the POWER switch is set to ON.**
- The backup batteries are exhausted. ➡ Replace the backup batteries.

**Three digits farthest to the right on the Frequency Counter disappear.**
- The pushed-in TUNING knob has been turned after 00.0 or 99.9 appeared on the counter. ➡ Turn the knob the opposite way.

**The frequency does not change from 0 or 000.0 when the pushed-in TUNING knob is turned.**
- The pulled-out TUNING knob was turned to 000. before the knob was pushed in. ➡ Pull the knob out and tune to a frequency other than 000..

**The correct frequency does not appear.**
- Weak batteries.
- The POWER switch was turned ON and OFF rapidly in succession. ➡ Press the SEARCH CHECK button to return the correct frequency.